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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/777,840	02/12/2004	Ming-Lai Lai	56510US004 (P01,0391 01)	5900

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EXAMINER

WILSON, JOHN J

ART UNIT	PAPER NUMBER
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3732

NOTIFICATION DATE	DELIVERY MODE
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05/23/2008

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No. 10/777,840	Applicant(s) LAI ET AL.	
	Examiner John J. Wilson	Art Unit 3732	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 February 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 50-106 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 50-106 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 50-53, 58 and 59 are rejected under 35 U.S.C. 103(a) as being unpatentable over Andreiko et al (5454717) in view of Chishti et al (6471511). Andreiko shows a computer implemented method of analyzing an orthodontic treatment comprising storing original positions, 94, Figs. 2, 2A, storing final positions, 95, Fig. 2B, designing appliances Fig. 2C and providing a computer generated output in the form of instructions for manufacturing the appliances, 97, Fig. 2D. During the step of designing appliances, Andreiko uses many different calculating methods, Figs. 2P-2U, including calculating positions and calculating the lever arm of the arch wire, Fig. 2Y, which, as known in the art, is used to apply the desired force to move the teeth, and this movement is only between the original and final positions. Andreiko does not show using finite element analysis. Chishti (511) shows modeling a first position, column 5, lines 13-15, modeling a desired second position, column 5, line 23 and performing a finite element analysis there between, column 5, lines 19-25. It would be obvious to one of ordinary skill in the art to modify Andreiko to include the use of finite element analysis as shown by Chishti (511) in order to make use of art known ways to better analyze

teeth movement. As to claim 51, to use finite element analysis to analyze the treatment from the final to the original positions is an obvious matter of choice in direction and in the local points chosen for the analysis, such manners of using finite element analysis being well known mathematical methods for obtaining insights into a system. As to claim 58, Chishti (511) teaches using materials and tissue properties. It would also be obvious to modify Andreiko to include taking into account these parameters. The specific tissue used is an obvious matter of choice in using known parameters that affect the forces on teeth. As to claim 59, Andreiko shows using a display, however, does not specifically state the information that is displayed. The specific information displayed is an obvious matter of choice in the information that it is desired to communicate.

Claims 54-57 are rejected under 35 U.S.C. 103(a) as being unpatentable over Andreiko et al (5454717) in view of Chishti et al (6471511) as applied to claim 50 above, and further in view of Chishti et al (2001/0002310) and Tang et al (6205366). The above combination shows the steps as described above, however, does not show the use of vectors. Chishti (310) teaches using vectors, see paragraphs 162-165. It would be obvious to one of ordinary skill in the art to modify the above combination to include the use of vectors as shown by Chishti (310) because using vectors to define positions, forces and other parameters is well known and obvious to obtain the desired results. While Chishti (310) teaches using vectors for orthodontic analysis, the reference does not show using vectors with the finite element method. Tang teaches that it is well

known in the mathematics of the finite element method to use vectors, column 7, line 65 through column 8, line 14. It would be obvious to one of ordinary skill in the art to modify the above combination to include the use of vectors in order to analyze the desired parameters of the system.

Claims 60, 61, 66-69, 103, 104 and 106 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chishti et al (6471511) in view of Umeyama et al (6080199). Chishti (511) shows modeling a first position, column 5, lines 13-15, modeling a desired second position, column 5, line 23 and performing a finite element analysis there between, column 5, lines 19-25. Chishti does not state using contact pairs during finite element analysis. Umeyama teaches that it is well known to use finite element analysis with contact points in order to analyze the loads, column 5, lines 13-25. It would be obvious to one of ordinary skill in the art to modify Chishti (511) to include analyzing at contact points as taught by Umeyama in order to better model the loads in the system, and because, it is well known that forces are applied directly through contact points, therefore, any teaching of evaluating forces on teeth inherently suggests considering the areas where the forces are to be transferred, and as such, would be obvious to one of ordinary skill in the art. As to claim 61, to use finite element analysis to analyze the treatment from the final to the original positions is an obvious matter of choice in direction and in the local points chosen for the analysis, such manners of using finite element analysis being well known mathematical methods for obtaining insights into a system. As to claim 68, Chishti (511) teaches using materials and tissue. The specific

tissue used is an obvious matter of choice in using known parameters that affect the forces on teeth. As to claim 69, Chishti (511) shows using a display, however, does not specifically state the information that is displayed. The specific information displayed is an obvious matter of choice in the information that it is desired to communicate.

Claims 62, 63 and 105 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chishti et al (6471511) in view of Umeyama et al (6080199) as applied to claim 60 above, and further in view of Chishti et al (2001/0002310) and Tang et al (6205366). The above combination does not show the use of vectors. Chishti (310) teaches using vectors, see paragraphs 162-165. It would be obvious to one of ordinary skill in the art to modify the above combination to include the use of vectors as shown by Chishti (310) in order to use known mathematical analysis techniques to obtain the desired results. While Chishti (310) teaches using vectors for orthodontic analysis, the reference does not show using vectors with the finite element method. Tang teaches that it is well known in the mathematics of the finite element method to use vectors, column 7, line 65 through column 8, line 14. It would be obvious to one of ordinary skill in the art to modify the above combination to include the use of vectors in order to analyze the desired parameters of the system. As to claim 63, see comments above with respect to claim 61.

Claims 64 and 65 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chishti et al (6471511) in view of Umeyama et al (6080199) as applied to claim 60

above, and further in view of Andreiko et al (5454717). Chishti shows moving teeth from original to final positions with the use of intermediate position, and as such, the above combination does not show using the finite element analysis on moving the teeth from the original position to the final position in one step. Andreiko teaches that it is well known to move teeth from the original to final positions, see above. It would be obvious to one of ordinary skill in the art to modify the above combination to include moving teeth in one step as shown by Andreiko as it is a matter of choice in the number of steps used to obtain the desired results.

Claims 70-75, 77-96 and 98-102 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sachdeva et al (6350120) in view of Chishti et al (6471511). Sachdeva teaches a computer implemented method comprising storing a first model of the teeth in their first position, 130, Fig. 6, storing a second model of the teeth in a second position, 132, storing a subset of appliances, the type, column 6, lines 24-30, from a set of types as described, analyzing if the bracket appliances effectively moves the teeth, and if not, providing a new type of bracket, column 6, line 60 through column 7, line 6. Sachdeva does not show using finite element analysis to evaluate the effectiveness and does not show displaying the information. Chishti (511) shows modeling a first position, column 5, lines 13-15, modeling a desired second position, column 5, line 23 and performing a finite element analysis there between, column 5, lines 19-25, and teaches that this method can be used with braces including brackets and archwires, column 2, lines 1-15. It would be obvious to one of ordinary skill in the

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art to modify Sachdeva to include using finite element analysis to evaluate the movement of teeth from a first to a second position as shown by Chishti (511) in order to better move the teeth to a desired position. With respect to the step of displaying, Chishti (511) shows using a display, however, does not specifically state the elements displayed. The specific information displayed is an obvious matter of choice in the information that it is desired to communicate. To not choose appliances that have an undesired effect is an obvious matter of choice in the selection of the appliances to obtain the desired results. To use stresses and strains in a finite element calculation is well known and would be obvious to one of ordinary skill in the art. As to claims 74, 85 and 95, to use finite element analysis to analyze the treatment from the second to the first positions is an obvious matter of choice in direction and in the local points chosen for the analysis, such manners of using finite element analysis being well known mathematical methods for obtaining insights into a system. As to claims 75 and 83, to analyze in stages is an obvious matter of choice in the order and number of known steps used to do an analysis to one of ordinary skill in the art. As to claim 86, Chishti (511) teaches using intermediate positions.

Claims 76 and 97 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sachdeva et al (6350120) in view of Chishti et al (6471511) as applied to claims 70 and 89 above, and further in view of Chishti et al (2001/0002310) and Tang et al (6205366). The above combination shows the steps as described above, however, does not show the use of vectors. Chishti (310) teaches using vectors, see paragraphs

162-165. It would be obvious to one of ordinary skill in the art to modify the above combination to include the use of vectors as shown by Chishti (310) because using vectors to define positions, forces and other parameters is well known and obvious to obtain the desired results. While Chishti (310) teaches using vectors for orthodontic analysis, the reference does not show using vectors with the finite element method. Tang teaches that it is well known in the mathematics of the finite element method to use vectors, column 7, line 65 through column 8, line 14. It would be obvious to one of ordinary skill in the art to modify the above combination to include the use of vectors in order to analyze the desired parameters of the system.

Response to Arguments

Applicant's arguments filed February 18, 2008 have been fully considered but they are not persuasive. Applicant argues that because Andreiko (717) teaches using a set of arch wires, it cannot suggest performing an analysis based on original and final positions. This is disagreed with because it is clear that the analysis of Andreiko is from the original to final positions, the suggestion that more than one arch wire may be used is clearly an option that may be used if desired or needed to move to the final position, this does not obviate the teaching of the analysis from original to final. Applicant also argues that Andreiko does not teach that forces are used in the calculations. It is agreed that Andreiko teaches calculating positions and also teaches calculating the lever arm when making the arch wire, see citation above. It is held that the above teachings suggest using the computer to calculate moving teeth from an original to a

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final position, and that the rejection is based on a combination which teaches using finite element analysis (FEA) for moving teeth from one position to another. Applicant also argues that Chishti (511) does not show using FEA from an original to a final position because it include a sequence of appliances. This statement is agreed with, however, because the rejection is based on a combination that shows the claimed elements, this argument does not overcome the rejection. With respect to Tang it is also agreed that this reference does not show all the claimed features, however, the combination does and is proper. With respect to Umeyama, applicant argues that the reference is to a different art, forces between gears and not between orthodontic appliances. It is held that FEA is a well known mathematical analysis tool and that its use in orthodontics is taught and suggested by Chishti as applied. It is also held that one of ordinary skill in the art would understand that an analysis of forces for moving teeth in an orthodontic system would require an analysis of contact points. Umeyama teaches a know solution of the problem of analyzing forces between elements, and as such, is analogous art and suggestive of the combination. Applicant argues that Sachdeva (120) shows doing an analysis from a first stored position to a final unknown position, then compares the unknown position to the final stored position. Applicant holds that this does not meet the claim limitation of performing an analysis from a first stored position to a second stored position. The present invention teaches that a result of the analysis to determine any undesired effects. It is held that a step of comparing effects is inherent in such a determination. It is held that the step of Sachdeva of comparing the moved to position with the desired final position is part of the analysis,

and therefore, meets the claim language. The present disclosure does not specifically define the used terminology, and the above interpretation is reasonable and proper. Further, Chishti teaches the use of FEA, and as such, the combination suggests and teaches the claimed method step, to include analysis from a first to a second desired position.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John J. Wilson whose telephone number is 571-272-4722). The examiner can normally be reached on Monday through Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cris Rodriguez, can be reached at 571-272-4964. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

***/John J Wilson/
Primary Examiner
Art Unit 3732***

jw
April 28, 2008